

A. Cover Sheet (*Attach to front of proposal.*)

1. Specify: **X Agricultural Project** X individual application
2. Proposal title: **On-Farm Integrated Irrigation and Drainage Management**
3. Principal applicant: **West Hills Community College District**
4. Contact name: Larry P. Rathbun, Ph.D.
 Farm of the Future Project Director
5. Mailing address: **West Hills Community College**
 300 Cherry Lane
 Coalinga, CA 93210
6. Telephone: 559-284-8188
7. Fax: 559-934-3072
8. E-mail: rathbunl@whccd.cc.ca.us
9. Funds requested: \$568,645
10. Applicant cost share funds pledged dollar amount: \$ 553,740
11. Duration: July 1, 2001 to June 30, 2002
12. State Assembly and Senate districts and Congressional district:
- State Assembly District: **Dean Florez 30th District**
- State Senate District: **Jim Costa 16th District**
- Congressional District: **Calvin Dooley 20th District**
13. Location and geographic boundaries of the project:
- 1.2 miles northeast of the city of Coalinga at the corner of Hwy 198 and Gravel Pit
 roads, within the watershed of Los Gatos Creek and DWR Sub-Region 14.
14. Name and signature of official representing applicant. By signing below, the applicant declares the following:
- ___ the truthfulness of all representations in the proposal;
- ___ the individual signing the form is authorized to submit the application on behalf of the applicant;
- ___ the applicant will comply with contract terms and conditions identified in Section 11 of this PSP.

(printed name of applicant) **Dr. Frank P. Gornick**

(date)

(Signature) **Dr. Frank P. Gornick, President**

B. SCOPE OF WORK

Relevance and Importance

1. *Abstract (Executive Summary).*

The Westlands Area, Sub-region 14, represents more than 1,000 square miles of watershed influenced by and affecting the CALFED Bay-Delta Program. **On-farm irrigation and drainage practices conducted within the Westlands Area have been identified as high priority interests by federal, state and local agencies and organizations.**

As a part of the West Hills College Farm of the Future, **this project will create an instructional resource demonstrating effective and efficient on-farm integrated irrigation and drainage practices.**

With the guidance of an Industry Advisory Committee (Attachment A), this project will identify and demonstrate current irrigation and drainage practices and technologies, and incorporate new practices as they may become available for commercial use. **Design, installation, and operation of the farm irrigation and drainage system utilizing a variety of annual and permanent trees and crops will be achieved during the first year of operation.** Additional crops, trees, and vines will be included in subsequent years as will demonstrations of planting densities and other crops.

This project has the following objectives:

A. Improve the farm irrigation system

1. Develop an irrigation well.
2. Design and install a farm irrigation and drainage system.
3. Install and operate scientific and practical water monitoring devices.
4. Collect, record, and distribute performance data.

B. Demonstrate the effective and efficient use of water

1. Plant selected crops and trees
2. Monitor plant growth and production
3. Conduct seminars and short courses for agricultural industry personnel.
4. Conduct classes for community college students.
5. Conduct in-service education programs for teachers, agency personnel, and other organizations interested in activities at the site.
6. Develop and maintain a web site including remote control web camera.

2. *Statement of critical local, regional, Bay-Delta, State or federal water issues, which includes an explanation of the need for the project, who wants it, and why. Describe how this project would be consistent with local or regional water management plans or other resource management plans.*

Farmers and farm supervisory employees in the area have participated in agency and university sponsored irrigation educational activities. Farm management personnel are generally well versed in each of these project objectives, however, there is general agreement among members of the advisory committee and other members of the Westlands Area that irrigation and drainage information and learning opportunities have generally not been made available to the actual irrigator or irrigation scheduler.

This project will provide a basic resource permitting the college to meet the needs of the farming community consistent with the work of others to increase the efficient use of irrigation water while minimizing drainage from the root zone. This project will compliment and extend the services provided by universities, agencies, and organizations. **The geographical location of West Hills College and its proximity to the Westside Area provides a special opportunity to demonstrate and provide instruction to the field irrigator and irrigation scheduler.**

3. *Nature, scope, and objectives of the project.*

Nature of the Project:

The purpose of this project is to design, develop, and operate an on-farm integrated irrigation and drainage management system as an instructional resource for the agricultural industry.

Sub-region 14, the Westlands Area, represents more than 1,000 square miles of watershed influenced by and affecting the CALFED Bay-Delta Program. On-farm irrigation and drainage practices conducted within the Westlands Area have been identified as high priority interests by federal, state and local agencies and organization. Experience has shown that effective and efficient use of water is critical to the future of farming in the area.

Farmers need employees who have knowledge and experience in maximizing the use of limited water supplies while optimizing crop production and minimizing drainage from the root zone. As a part of the West Hills College Farm of the Future, **this project will create an instructional resource for improving the water education levels of members of the farming community by demonstrating effective and efficient on-farm integrated irrigation and drainage practices.**

With the guidance of an industry advisory committee (attachment A), **this project will identify and demonstrate current irrigation and drainage practices and technologies, and incorporate new practices as they may become available for commercial use.**

Design, installation, and operation of the farm irrigation and drainage system utilizing a variety of annual and permanent trees and crops utilizing plant varying plant densities will be achieved during the first year of operation. Additional crops, trees, and vines will be included in subsequent years.

Scope of the Project:

This project will be conducted on 210 acres of land within the watershed of Los Gatos Creek located at the corner of Hwy 198 and Gravel Pit Road approximately 1.2 miles northeast of the city of Coalinga. The following activities will be completed as part of the project objectives:

1. Design, install and operate an on-farm integrated irrigation and drainage system with the primary objective to demonstrate irrigation flexibility, efficiency, and minimize drainage.
2. Demonstrate alternative irrigation systems and practices including efficient furrow, sprinkler, and surface and sub-surface drip/micro low volume applications.
3. Select and install meters for the groundwater well.
4. Select and install soil moisture determination devices for calculations of field capacity, permanent wilting point, soil moisture deficit, and soil moisture tension using data logging devices and software systems.
5. Demonstrate irrigation practices that optimize water available in the plant root zone while minimizing drainage.
6. Demonstrate evapotranspiration monitoring and calculation systems.
7. Incorporate system data into a local Irrigation Management Information System (IMIS).
8. Incorporate the IMIS data into the West Hills College Precision Farming Program utilizing the latest GPS and GIS technologies.
9. Develop and maintain a web site as one means of disseminating reports from the site.

10. Select and install remote control web cameras to complement the web site data.

11. Provide results of the various demonstrations via printed and web based dissemination to all interested persons at least quarterly commencing after the first six months of this project.

Objectives of the Project:

A. This project is submitted in response to Conditionally Applicable Efficient Water Management Practice [proposal solicitation package pg. 16, # 3]:

"Facilitate the financing of capital improvements for on-farm irrigation systems. Project funds will be used to match local cost sharing funds in order that each of the project objectives stated above may be achieved."

B. This project addresses Quantifiable Objective #164:

"Reduce ET flows using improved irrigation methods."

C. This project will also **demonstrate soil drainage patterns.**

Technical/Scientific Merit, Feasibility, Monitoring, and Assessment

4. Methods, procedures, and facilities.

The need for this project has been determined by visits with local farmers and irrigation district personnel. Building upon the knowledge and experiences of the local advisory committee, project personnel will consult with individuals who possess the technical and practical experiences necessary to complete the project and achieve each of its objectives and activities.

The project director has extensive experience in administering projects of similar size and complexities including completing projects on schedule and within budget. Local project personnel with successful farming and irrigation system management experiences will be integral parts of the project design, installation, and operation. Outside consultants will be retained for each project component as needed. The project director will conduct the project activities in consultation with irrigation district leaders, university personnel, and industry representatives in addition to the local advisory committee.

West Hills College has conducted instruction in agriculture for more than fifty years with an emphasis of hands-on field experiences. This project will enhance the facilities, equipment, and curriculum of the college in response to the needs of the agricultural community. **The Farm of the Future Project has generated much interest in the area for its potential to provide up-to-date education for the benefit of all members of the community. This project will be a key component in responding to the needs of the farming community.**

5. Schedule

Task	Due Date	Deliverable	Projected Costs
Grant Award	06-15-01	Contract award	
Design system	07-20-01	System design	\$ 10,000
Consultant contract	07-01-01	Retain consultant(s)	\$ 54,000
Deep Well	07-15-01	Well drilled/tested	\$ 155,000
1st Quarter Rpt	09-30-01	Report filed	
Installation	11-15-01	Sensors installed	\$ 20,000
2nd Quarter Rpt	12-30-01	Report filed	
Plant Crops	03-25-02	Crops planted	\$ 20,000
Complete web page	03-25-02	Web site operational	\$ 5,600
3rd Quarter Rpt	03-30-02	Report filed	
Conduct short course	04-15-02	On-site short course	
Conduct field courses	05-20-02	Huron and Lost Hills	
Operate web site	06-15-02	Web camera functioning	\$ 3,500
4th Quarter Rpt	06-30-02	Report filed	
Final Report	07-30-02	Final report filed	

6. Monitoring and assessment

The project chart forms the basis for project monitoring and evaluation. The project director will be in continuous consultation with members of the local advisory committee, and issue a project update monthly to all interested parties. Meetings of the Irrigation and Drainage Project sub-committee of the advisory committee will be held as needed or at least quarterly during the life of the project.

Project data will be collected, processed, and stored locally. Data will be made available as appropriate on the web via the college internet connections. Printed reports will be produced as necessary to complete the activities and objectives of the project.

West Hills College Agriculture Department has been awarded a grant by the United States Department of Agriculture to develop and conduct a program of instruction in precision farming using GPS mapping technologies and GIS management systems. Data from this project will be integrated into the precision farming program including data related to water utilization, drainage measurements, and crop yields.

C. OUTREACH, COMMUNITY INVOLVEMENT, AND INFORMATION TRANSFER

1. *Describe outreach efforts to contact and involve participation from people in disadvantaged communities. Describe efforts to extend the benefits of the project to people in disadvantaged communities and develop partnerships, as appropriate. Describe efforts to involve and extend the benefits of the project to tribal entities in the area.*

The West Hills College Farm of the Future Advisory Committee has been developed with membership from all parts of DWR Area 14 - the Westlands Area. Committee members represent persons from communities of high unemployment. The College has been identified as a Hispanic Serving Institution with a high percentage enrollment of Hispanic students.

The Advisory Committee has previously established a program objective of reaching out to all members of the community including conducting classes and short-term vocational courses in Spanish and at locations throughout the district when appropriate in order to maximize student/adult participation and minimize travel requirements.

2. *Training, employment, and capacity building potential. Estimate the number and level of people or organizations that are expected to receive training, employment, or capacity building benefits from the project.*

The pilot project anticipates that approximately 20 individuals will participate in training and capacity building activities during the project funding period as the system is designed, installed and initially operated.

The project anticipates that **more than 380 individuals will participate in training and capacity building activities during the twelve months immediately following completion of the project.** This will include approximately:

- 30 regular college students
- 70 individuals currently employed on area farms
- 30 farm managers and supervisors
- 20 irrigation district personnel
- 40 non-farm members of local communities
- 200 persons who access project reports via the internet

It is anticipated that **more than 200 persons will participate in educational activities related to this project each subsequent year.** The number may increase as familiarity in the use of the web and remote controlled web cameras grow.

3. *Describe the plan for disseminating information on the results of the project and promoting their application.*

As a center for applied learning and community involvement, West Hills College maintains a continuous program of educational activities and information dissemination. This project will be an integral part of the outreach education programs of the college. Following suggestions made by the Advisory Committee, formal and informal instructional activities will be conducted on a continuing basis. The Farm of the Future project has a primary objective of promoting change and improvement in the agricultural community.

This project will include the development of a new web site for disseminating the progress reports and technical data derived from the project. **A special feature of the new web site will be the operation of a remote controlled web camera that permits individuals visiting the web site to view some of the irrigation and drainage system components and the crops grown on the site.**

4. *Provide a copy of the letter sent to the local land use entity, water district, or other potentially impacted or cooperating agencies notifying them of the proposal.*

[Attachment B]

D. QUALIFICATIONS OF THE APPLICANTS, COOPERATORS, AND ESTABLISHMENT OF PARTNERSHIPS

1. Include a resume(s) of the project manager(s). Resumes shall not exceed two pages.

[Attachment C and D]

2. Identify and describe the role of any external cooperators that will be used for this project.

A cooperative working relationship exists with area farms as referenced by the membership of the Advisory Committee, (see attached) and through them, to the several irrigation districts in the area. While communicating their needs for the project, each person and organization has indicated a willingness to cooperate in helping the college achieve the project objectives.

3. Provide information about partnerships developed to implement the project.

In developing this proposal, partnerships are being built with many sectors of the agricultural community with an interest in water conservation. The advisory committee roster continues to grow as new individuals, agencies, companies, and organizations express an interest in activities of the Farm of the Future and its programs in Precision Farming and on-farm integrated Irrigation and Drainage.

E. COSTS AND BENEFITS						
1. Budget Summary and Detail						
			Requested Funds	Local Funds	Total Costs	Costs
a. Salaries and Wages					\$127,600	
Project Director	220 days x \$400 x .30			\$26,400	\$26,400	
Clerical	220 days x \$120 x .5	\$13,200			\$13,200	
Technicians	220 days x \$120 x .2	\$52,800			\$52,800	
Student Assistants	220 days x \$80 x .2	\$35,200			\$35,200	
b. Fringe Benefits	S&W x .30%	\$30,360			\$30,360	\$30,360
c. Supplies					\$82,900	
Telephone	12 mos x \$300	\$3,600			\$3,600	
Postage and shipping	12 mos x \$100	\$1,200			\$1,200	
Paper and office supplies	12 mos x \$300	\$3,600			\$3,600	
Primers and adhesives - PVC		\$500			\$500	
Tractor fuel and oils	12 mos x \$500	\$6,000			\$6,000	
Misc. wiring and plumbing		\$5,000			\$5,000	
Irrigation pipe - aluminum 6"	1000 ft. x \$3			\$3,000	\$3,000	
Irrigation pipe with sprinkle	2000 ft. x \$2.50			\$5,000	\$5,000	
Distribution pipe - pvc 12"	5000 ft. x \$4 installed			\$20,000	\$20,000	
Low volume sprinkler syst	4000 ft. x \$5 installed			\$20,000	\$20,000	
Drip system	12000 ft. x 1.25			\$15,000	\$15,000	
d. Equipment					\$144,700	
Soil moisture sensors	12 x \$500	\$6,000			\$6,000	
Weather station and softw	1 x \$2,000	\$2,000			\$2,000	
Data logger	4 x \$1,200	\$4,800			\$4,800	
Parameters	2 x \$1,500	\$3,000			\$3,000	
Flow meter	2 x \$2,200	\$4,400			\$4,400	
Pump for 16" well casing		\$50,000			\$50,000	
Power source	power tbd	\$35,000			\$35,000	
Water quality testing equip	tbd			\$5,000	\$5,000	
Low volume system pump				\$5,000	\$5,000	
Web camera	1 system - installed	\$3,500			\$3,500	
Water filtration system				\$26,000	\$26,000	
e. Services or Consultants					\$232,000	
Well drilling and development		\$155,000			\$155,000	
Irrigation/drainage consult	90 days x \$600	\$54,000			\$54,000	
System design consultant	20 days x \$500	\$10,000			\$10,000	
Water quality testing		\$3,000			\$3,000	
Pump power source instal		\$10,000			\$10,000	
f. Travel					\$19,190	
Consultant travel		\$13,780			\$13,780	

2. Budget Justification

Provide a brief explanation for the labor costs (including consultants), equipment, supplies, and travel included in the budget.

a. Salaries and Wages

Director: The project director will devote at least 30% of his time to this project.

Clerical: Office support equal to .5 times will be devoted.

Technicians: Qualified technicians will be to assist with the technical aspects of this project equal to two full time positions

Student assistants: Students will be employed to assist with the implementation of this project equal to two full time positions.

b. Fringe benefits: Benefits are calculated at 30% of salaries and wages

c. Supplies:

Telephone, postage, shipping, paper and office supplies are estimated as indicated.

Primers, adhesives tractor fuels and oils are estimated based upon prior experience.

Miscellaneous wiring and plumbing is an estimate for those supplies needed to install the irrigation and drainage system and its monitoring and control devices including supplies to support installing the web camera system.

Local funds have been identified in the amounts specified to purchase the irrigation pipe, distribution pipe, sprinklers, and drip systems.

d. Equipment:

Soil moisture sensors: It is estimated that approximately twelve soil moisture sensors will be required to complete the system design. Although it is expected that commercial firms may donate some sensors, the budget provides for a uniform set of wireless units linked to the system's data logger.

Weather station: A weather station will be installed at the site to provide data useful in calculating Evapo Transpiration rates and logging weather related data.

Data loggers: Four data loggers are budgeted due to the variety of system components anticipated in the system design.

Porometers: A porometer is budgeted to provide another level of scientific data to the demonstration site.

Flow meters: Two flow meters are budgeted: one for placement near the well and one for optional placement within the system if needed by final system design.

Pump: An irrigation pump is required for the anticipated 1,200 gpm well production.

Power source: The site has ready access to natural gas and electricity; diesel power is an additional option. Selection of the power source will be completed with the advice of the system consultant and the advisory committee.

Water quality testing equipment funding has been identified locally in order that the site may demonstrate water quality testing for visitors and program participants.

Low volume pump: It is expected that the design consultant may recommend some form of temporary water storage in order to promote efficiency of the pump

and its power source, and to provide additional flexibility in water delivery schedule. The low volume pump is intended for use with the low volume systems of the project.

Web camera: One web camera system is budgeted consisting of at least two remote control cameras with modems for communicating with the college LAN and system server. The price identified is an anticipated installed price including software.

Water filtration system: Local funds have been budget for an optional model water filtration system should the system design so require.

e. Services or consultants

Well drilling and development. The price has been estimated by the same company that completed a well located with 500 yards of the expected site and includes fair market wages.

Irrigation/drainage consultant: Funds are budgeted for the service of at least one individual with experience in elements expected to be included in the project design.

System design consultant: Funds are budgeted for an individual to work in cooperation with the advisory committee, the local campus planners and architects, and the advisory committee in developing the design of the system including specifications for its several parts.

Pump power source install: Funds are budgeted for installing the power source connected to the pump and well once the type of power has been determined.

f. Travel

Consultant:

4,000 miles x \$.32 =	\$ 1,280
100 nights lodging x \$90 =	\$ 9,000
100 days meals x \$35 =	<u>\$ 3,500</u>
	\$13,780

Director:

3,000 miles x \$.32 =	\$ 960
30 nights lodging x \$90	\$ 2,700
50 days meals x \$35 =	<u>\$ 1,750</u>
	\$ 5,410

g. Other Direct Costs

Web site development: Funds are budget to develop the web site including presentation and control of the on-site web camera.

210 acres have been donated to West Hills College for the Farm of the Future project including this project.

Indirect costs have been budgeted at 10% of total direct costs.

3. Benefit Summary and Breakdown

a. The following benefits are anticipated as a result of this project. Each will directly benefit the CALFED program through increased water efficiency on the site, improved water efficiency on the farms of individuals participating in activities

of the site, and a better-informed public as a result of those persons visiting the site in person or via the internet.

1. Reduced ET from the crops and trees grown on the site.
Data will be collected and processed demonstrating the amount of reduction in ET as a result of the several parts of the system
2. Reduced drainage from the root zones.
Data will be collected and processed demonstrating the amount of the reduction in drainage from the root zones in the several parts of the system.
3. Increased water use efficiency
Data will be collected and processed demonstrating the water efficiency of each part of the system and the increased efficiency when compared to other parts.
4. Increased water effectiveness
Data will be collected and processed demonstrating the water effectiveness of each part of the system and the increased effectiveness when compared to other parts.
5. Increase in numbers of persons understanding principles and practices for increasing water efficiency. Data will be collected and processed recording the numbers of persons visiting the site, participating in the instructional activities, and/or visiting the web site.

b. For project outcomes and benefits that are not quantifiable, provide a qualitative description of such project outcomes and benefits.

1. DWR recognition from language used in publications, web site pages, and on signage provided at the site due to DWR funding of this proposal.
2. Increased awareness within the general public of agriculture's efforts to conserve water and use it most efficiently.
3. Recognition of the value of the community college system to serve the needs of the local communities.
4. Greater understanding of the relationship between agriculture and water by public school children who visit the Farm of the Future and the Integrated Irrigation and Drainage Management site either in person or via the web.

4. Assessment of Costs and Benefits. Include an assessment that summarizes the costs and benefits of the proposed project. The assessment shall adhere to the following general guidelines:

a. List and explain all major analysis assumptions.

- 1. Reduced ET from the crops and trees grown on the site.**
- 2. Reduced drainage from the root zones.**
- 3. Increased water use efficiency**
- 4. Increased water effectiveness**

It is assumed that the instrumentation installed with this system will collect, record, and provide analysis for forming decisions related to the increase effectiveness and efficiency that may be expected if the several component parts are incorporated on area farms. The scientific data will be complimented by hands on examination of soils of various moisture levels, examination of the related components, and examination of the health and performance of the plant.

5. Increase in numbers of persons understanding principles and practices for increasing water efficiency.

It is assumed that individuals participating in activities sponsored by the proposal will gain a deeper appreciation for and understanding of water and its use. Because the Farm of the Future will be conducting several outreach educational efforts, it is assumed that participating farmers and farm workers will gain and understanding of the principles and because there is expected to be economic benefits for doing so, will implement improved water practices on their farms.

b. Express all benefits and costs in year 2000 dollars. Do not adjust future dollar values for expected general inflation.

The Targeted Benefits of Objective 164 for the Westlands Area indicates a goal of reducing nonproductive ET by 8.9 TAF/yr. Sub-region 14, Westlands Area, can usually expect an ET loss of applied water approximating 28.2 feet per year. Thus, the goal is to reduce nonproductive ET by approximately 32%.

The 210-acre site will involve an initial planting of 50 acres of pistachios, eventually growing to approximately 100 acres. In a normal year, an orchard crop is expected to have a total ET of 37.4 inches per acre. Assuming that the installed system will achieve the intended 32% ET reduction, the site should expect to see its nonproductive ET reduced by almost 12 inches per year.

A savings of 12 inches per year in nonproductive ET would result in reducing the water requirements by one acre foot, or 50 acre feet for the initial planting. Assuming a value of \$65 per acre-foot, the 50-acre feet savings would have an annual value of \$3,250. Assuming a useful life of the system to be ten years, it is anticipated that the savings will approach \$32,500 during the life of the system for these 50 acres.

If similar savings can be achieved on the remaining 160 acres, total site savings might approach four times the initial value or \$130,000 during the first ten years.

Assuming that the 100 farms have representatives who participate in the educational functions of the Farm of the Future, and

the Integrated Irrigation and Drainage Management program. and

that 20% of the participants (20 farms) implement similar practices on their farms of 1,000 acres or more

the project could possibly reduce area water use – nonproductive ET – approaching 20,000 acre-feet per year. [20 farms x 1,000 acres x 1-acre ft]

for a value of \$1,300,000 per year! [20,000 acre-feet x \$65]

c. Convert all costs and benefits to their present value equivalents prior to aggregating them. Use a six percent discount rate.

<u>Value</u>	<u>Year One</u>	<u>Ten years</u>	<u>6% Discount</u>
Projected CALFED project costs	\$ 568,645	\$ 568,645	\$ 534,526
Projected on-site savings	\$ 3,250	\$ 32,500	\$ 30,550
Projected area farm savings	\$1,350,000	\$13,500,000	\$ 12,690,00

d. Compile a table showing the present value of the quantified costs and benefits for the applicant, each project beneficiary, CALFED, and any other parties affected by the project. Compile a summary of the non-quantified costs and benefits to the applicant, each project beneficiary, CALFED, and any other parties affected by the project.

	<u>Year One</u>	<u>Ten years</u>
Projected CALFED project costs	\$ 568,645	\$ 568,645
Projected on-site savings	\$ 3,250	\$ 32,500
Projected area farm savings	\$1,350,000	\$13,500,000

Attachment A

ADVISORY COMMITTEE:

Ross Allen, owner, RMA Farms, Coalinga
Cathy Barabe, Grants and Research Officer, West Hills College
Joe Bezerra, Director, Agricultural Research Initiative, CSU-Fresno
Mark Borba, President, Borba Farms, Riverdale
Buddy Brooks, Superintendent, Riverdale Joint Unified Schools
Steve Cantu, owner, Cantu Farming, Tranquility
Allan Clark, owner, Clark Brothers Farming, Dos Palos
Steve Clark, PCA Agronomist, Western Farm Service, Huron
Dennis Elam, Paramont Farms
George Edes, City Manager, Coalinga
Eduardo Gonzales, Board Member, Coalinga-Huron Unified Schools
Mahlon Haile, Chair, Plant Sciences, CSU-Fresno
Ramon Dominguez, Mayor, City of Huron
Brad Gleason, Farm Manager, Coalinga
Mark Grewal, Vice President, J. G. Boswell Company, Lemoore
John Harris, owner, Harris Farms, Coalinga
Bill Henry, Board Member, West Hills College
Edna Ivans, Board Member, West Hills College
Phil Larson retired, Wilbur-Ellis Company, Kerman
Pat Lewis, Superintendent, Coalinga-Huron Unified Schools
John Macias, MESA, West Hills College
Bill Mouren, owner, Mouren Farming, Coalinga
David Orth, General Manager, Westlands Water District, Fresno
Bill Pucheu, Community Director, Pucheu Brothers Ranch, Tranquility
Kurt Quade, agronomist, Lemoore
Francis Squire, Westlands Water District, Fresno
Bill Spencer, Spencer Fruit Company, Coalinga
Tom Stephanopoles, Samoules Farms, Mendota
Jack Stone, owner, Stone Land Company, Lemoore
Tim Stone, Sales Manager, Britz Fertilizer, Five Points
Bob Viets, Pleasant Valley Water District, Coalinga
Bob Ward, Plant Manager, Tomatec, Firebaugh
Jack Woolf, owner, Woolf Farming, Huron
A. J. Yates, Kerman

Attachment B

Director
Westlands Water District

Director
Pleasant Valley Irrigation District

Director
Westside Resource Conservation District

Director
Tranquility Irrigation District

Dear Sir:

West Hills College continues to make progress with the Farm of the Future project. Our industry advisory committee has been very helpful in establishing project objectives and providing counsel on project implementation.

Attached, please find a copy of the funding request that has been submitted to Department of Water Resources to develop an on-farm integrated irrigation and drainage project. This project will help create a key component of the Farm of the Future so that we can demonstrate and provide instruction that increases that effectiveness and efficiency of irrigation water while maximizing plant growth and production. The project will also permit us to demonstrate techniques for minimizing drainage from the root zone.

An exciting part of this project will be the dissemination of progress reports and information via the web with the inclusion of a remote control web camera. Visitors to the site will be able to direct the camera at irrigation components and observe plant growth. These pictures will compliment the system performance data generated at the site. A high priority is to begin providing short courses for irrigators and irrigation schedulers at the earliest opportunity.

We continue to welcome your participation in the Farm of the Future project and especially in this project of on-farm integrated irrigation and drainage management.

Sincerely,

Larry P. Rathbun, Ph.D.
Project Director

Attachment C

LARRY P. RATHBUN, Ph.D.

PROFESSIONAL EXPERIENCE

Rathbun Associates, San Luis Obispo California

1992 - Principal, Leader of professional group providing consultant services in educational present planning and development including service as Director, Farm of the Future Project.

California Polytechnic State University, San Luis Obispo, California

1970 Professor and Department Head, Agricultural Education Department. Associate Dean, 1992 College of Agriculture and manager of 6,000-acre farm. Chief of Party and Project

Director, Costa Rica Project. Develop new college of agriculture for the humid tropics. Develop support university funding proposals and negotiate contracts (48 months and \$2.5 million. Advise in budgeting, staffing, personnel policies, site and campus master plan and facility design (\$30 million construction cost).

Los Banos Unified School District. Los Banos, California

1967 Director of Vocational Agriculture and Teacher of Agricultural Science.
1970

Rio Vista High School. Rio Vista, California

1965 Director of Vocational Agriculture and Teacher of Agricultural Science and Mechanics.
1970.

INTERNATIONAL DEVELOPMENT

1998 Consultant, Agricultural College for the Humid Tropic Region, Costa Rica.
1987 Chief of Party and Project Director, Costa Rica Project.
1989 Travel to Brazil for ten-day assessment of library management
1988 Travel to Panama and Chile for ten days to interview candidates for Director of the
1987 Travel to Puerto Rico for five days to examine university and experiment
1987 Travel to Honduras for seven days to examine small farm production.
1985 Consultant, Coalicion Costarricense de Iniciativas de Desarrollo (CINDE)
1986 Served as consultant to CINDE in development of program plan and master plan
1978 Project Director, Mexico Agricultural Education Project.
1981 Project Director, Pakistan Agricultural Education Fellowship Program.
1974 Member, two-person team to conduct feasibility study of poultry production in Yemen
1970 Campus Backstopping, Thailand Agricultural Education Project.
1970 Campus Backstopping, Guatemala Mobil Agricultural School Project.

SPECIAL PROJECTS

Author and project director of the following special projects funded by various agencies with total value in excess of \$ 4.7 million in grant and contract funding.

1. Technical Assistance in Support of EARTH September, 1985 (\$2,500,000).
2. Cooperative Agreement between United Mexican States and California Polytechnic State University, San Luis Obispo, for the In-Service Education of Mexican Agricultural instructors. 1978-1980 (\$800,000).
3. Technical and Professional In-Service Improvement of Vocational Agriculture Teachers, 1978-1982 (\$250,000).
4. FFA Advisor Pre-Service and In-Service, 1979-1981 (\$125,000).
5. Pre-Service Training Agricultural Education Teachers, 1978-1981 (\$325,000).
6. Vocational Education Student Organization Advisor Workshop, 1979-1981 (\$45,000).
7. Evaluation of Instructional Materials Program, 1974-1980 (\$37,500).
8. Carnation Genetics Dairy Science Workshop, 1979 (\$12,500).
9. Study to Identify and Validate Beginning Vocational Agriculture Teacher Technical Competencies in Meat and Fish Processing, 1977 (\$8,500).
10. Involvement of Vocational Agriculture Students in Vocational Education Student Organizations. 1975 (\$96,000).
11. Study to Identify and Validate Beginning Vocational Agriculture Teacher Technical Competencies in Beef, Sheep, Swine and Horse Husbandry, 1975 (\$10,500).
12. Study of California Vocational Agriculture Teachers Perceptions of the Bureau of Agricultural Education, 1975 (\$3,500).
13. Yemen Poultry Planning Project, 1974 (\$85,000).
14. National FFA Achievement Award Program, 1973 (\$2,500).
15. Workshops for Training Teachers to More Effectively Involve All Students in FFA Programs, 1971 (\$65,000).
16. Workshops for Improving the Administration of Multi-Teacher Departments 1971 (\$65,000).

EDUCATION

- 1972- Ohio State University, Columbus, Ohio.
1973 Doctor of Philosophy in Agricultural Education and Vocational Education.
Minor in Educational Administration and Teacher Education.
June, 1974.

- 1964 California Polytechnic State University, San Luis Obispo, California.
1965 Master of Arts in Education with a Concentration in Agriculture, July, 1967.
1962- California Polytechnic State University, San Luis Obispo, California.
1964 Bachelor of Science in Poultry Industry
June, 1964.

Attachment D

Michael J. Day, P.E.

Mr. Day is a Senior energy and water resources engineer with eighteen years of experience. He has an extensive background in investigations, planning, and design of irrigation and drainage facilities for water agencies and farms. Mr. Day's areas of expertise include irrigation system design and evaluation, groundwater and surface water investigations, and surface and subsurface drainage systems design. He also has several years of experience in energy consulting for large agricultural energy users.

Sampling Of Ag-Water Related Experience:

- ◆ ***Airway Farms Dusters Ranch Drip Irrigation System Design, Huron, CA*** – Chief designer and supervised four person design team during design and construction of 1,200 acres of drip irrigation systems for new almond orchards. Systems included pump and filtration systems, buried PVC mainlines and laterals, above-ground tubing and emitters, and associated valves, fittings, and control systems.
- ◆ ***Lost Hills Water District SA-2 Canal Lining Project, Lost Hills, CA*** – Primary contact person, and P&P staff supervisor on the design and construction management of a five-mile long canal lining project. Existing earth canals were replaced with slip-form concrete lining. Existing transition and turnout structures were upgraded or replaced.
- ◆ ***Marchini Property Well and Pump Evaluation, Mendota, CA*** – Oversaw the testing and evaluation of the condition of 11 groundwater well pumps and 2 lift pumps. Evaluated the long-term outlook for groundwater quantity and quality underlying the property's well field and evaluated the quantity of surface water available.
- ◆ ***UCWSREC Irrigation System Upgrade, Five Points, CA*** – Chief designer and project manager for project to upgrade the existing irrigation distribution system on the University of California's Westside Research and Extension Center near Five Points. The existing concrete pipeline system was replaced and a new pressurized distribution system with a booster pump station was constructed to supply sprinkler and micro-irrigation systems.
- ◆ ***Westlands Water Conservation and Drainage Reduction Program, West Fresno County*** - Served as responsible engineer to lead consulting staff on District approved advisor team from 1986 through 1988. The team was responsible for assessing irrigation performance, evaluating irrigations, reporting results, and scheduling irrigations.

B.S. Civil Engineering, California State University, Fresno

Civil Engineer, California, #39494
American Society of Agricultural Engineers
United States Committee on Irrigation & Drainage